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INHIBITION OF 3-O-METHYL GLUCOSE TRANS-
PORT IN 'ASCARIS SUUM' MIDGUT BY 'ESCHERICHIA
COLI' ENDOTOXIN

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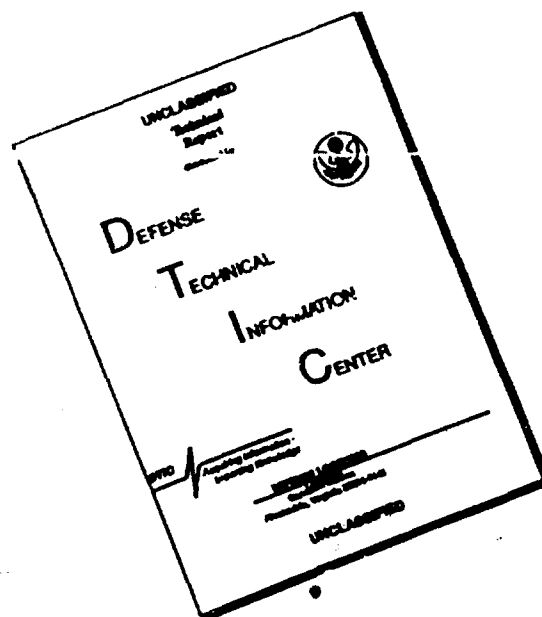
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<p>Movement of 3-0-methyl glucose across the midgut of <u>Ascaris</u> was inhibited by endotoxin. Inhibition was dependent on endotoxin concentration. Despite the fact that the mechanism by which the transport is inhibited is not known, the knowledge that absorptive processes <u>per se</u> can be impaired may lead to a better understanding of the mechanism of endotoxin action.</p>			

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John H. Migliaccio

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The thesis of this study was that the observed effects of endotoxin on intestinal helminths are due to altered nutritional status of the parasite.

The procedures followed in the experiments were patterned after those of Beames(1). Adult ascarids were collected at a local slaughter house and transported to the laboratory in saline (4), maintained between 32° and 39° C and were used within six hours. Individual worms were incised longitudinally with scissors. The reproductive system was pulled aside to expose the intestine which was then sectioned at the posterior portion. A Pasteur pipette was inserted into the lumen and secured with a silk ligature. Isolation of the middle third of the intestine was achieved by placing loops of silk thread around the intestine just beyond the tip of the Pasteur pipette and in the anterior region of the midgut. Material was introduced into the lumen of the intestine with a syringe fitted with a piece of polyethylene tubing which was inserted into the pipette. Fluid was forced into the intestine until it had moved past the most distant loop of thread. In this way the residual material in the intestine was flushed out of the preparation. The loops of thread were pulled tight and the resulting sac was cut free. The sac was blotted and placed in a vial containing 1.0 ml of glucose solution. The vial was stoppered with a 2-hole rubber stopper and flushed for 8-10 minutes with 95% N₂:5% CO₂, sealed and placed in a metabolic shaker for one hour at 37°C. Extra-luminal and intra-luminal solutions are shown in Table I. Endotoxin used in these experiments was a lipo-

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polysaccharide of Eschericia coli (Control 262759, Difco Pharmaceutical Co., Detroit Michigan). Bile salts (glucochanodeoxycholic acid) were used to solubilize the endotoxin in Ascaris saline. The bile salts solution was made in a 6mM concentration. Wasserman #1 paper was used and developed with butyl alcohol: pyridine: water (6:4:1/4) to detect the presence of any monosaccharides in the endotoxin and bile salts solutions. Both these solutions were found to be free of monosaccharides prior to mixing with a 3-0-methyl glucose for intraluminal injection.

The experimental results are shown in Table I. According to Beames (1), transfer of 3-0-methyl glucose was found to be 1.49 umoles/cm²/hr while the observed value in this experiment was 1.40 umoles/cm²/hr. Movement of 3-0-methyl glucose across the midgut of Ascaris was inhibited by endotoxin. Inhibition was dependent on endotoxin concentration. Despite the fact that the mechanism by which the transport is inhibited is not known, the knowledge that absorptive processes per se can be impaired may lead to a better understanding of the mechanism of endotoxin action.

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TABLE I. Effect of Endotoxin on Transport of 3-0-Methyl Glucose

Across Ascaris Sum Midgut

<u>Luminal Solution</u>	<u>Body Fluid</u>	<u>umoles 3-0-methyl glucose</u> <u>cm²/hr</u> (\pm sx)	<u>(n)</u>
0 μ g endotoxin (+)*	0.04M glucose	1.40 \pm 0.32	6
75 μ g endotoxin (+)*	0.04M glucose	0.50 \pm 0.05	5
100 μ g endotoxin (+)*	0.04M glucose	0.29 \pm 0.02	3

*0.04M C¹⁴ 3-0-methyl glucose (+)
0.04M 3-0-methyl glucose (+)
6mM glycochenodeoxycholic acid

All solutions were prepared in Ascaris saline. The solution on the luminal side of the gut contained 0.04M C¹⁴ 3-0-methyl glucose (8985 dpm/umole). Gas phase 95% N₂: 5% CO₂, temperature 37°C, time in metabolic shaker bath 60 min. (n) above indicates the number of replicates.